Science Activity: **Big Picture Questions**

Introduction:

Now that you studied frogs inside and out, it's time to revisit the questions we asked at the beginning of this section, and tie it all together with some big picture questions, and hopefully some answers.

Materials:

1. butcher paper
2. colored markers

Procedure:

1. Rewrite original set of questions on butcher paper:

    - How are amphibians adapted for aquatic life?
    - How are they well adapted for terrestrial life?
    - How are humans and frogs alike?
    - How are we different?
    - If amphibians have lungs, why do they also breathe through their skin?
    - Of the thousands of amphibians discovered, there is only one species that lives in the ocean. Although people have seen toads swimming in the ocean in Southeast Alaska, they don't live there. Why don't most amphibians live in or use the ocean?

2. Use the Similarities & Differences list (included) to get students started.

3. Add questions of your own.

Assessment:

1. Students answer big picture questions based on knowledge gained during their study of frog organs, anatomy, systems and function.

2. Students generate additional questions, or build on those that exist.

National Science Education Standards:

Content Standard C :

- Develop understanding of structure and function in living systems
- Develop understanding of diversity and adaptations of organisms

Alaska Content Standards:

Science C (2)

Juneau School District Core Content:

Science

Life and Human Biology(6th-8th):

Systems: How can we understand a complex world through its systems?

- Explain that our planet supports a wide variety of organisms; each has its place in the environment.
- Describe the parts and functions of the major human body systems

References:

Anatomy of the Frog. 16 March 2004 <http://www.lookd.com/frogs/anatomy.html>.

Comparative Anatomy Chart. Sidwell Friends School. 16 March 2004 <http://www.sidwell.edu/sidwell.resources/bio/Virtual...chart.htm>.

The Amphibians. 16 March 2004 <http://www.howe.k12.ok.us/~jimaskew/bamphib.htm>.

Human and Amphibian Similarities & Differences

Humans & amphibians have lots of similarities. Did you know that both have:

Body Part	Similarities
lungs	We both have lungs used for respiration.
digestive systems	We both have an esophagus, stomach, small and large intestine.
spleen, gall bladder, pancreas and liver	These organs process wastes.
circulatory systems	We both have veins, arteries and hearts.
brains	Although we both have brains, ours are more complex.
skeletons	These provide the framework for our bodies, protect internal organs and allow us to move.
Muscles and other connective tissue	These hold our skeletons together.

Although we have many of the same organs and systems, they work differently in amphibians than they do in humans.

System	Differences
body configuration	A frog' s heart, lungs and digestive system are all found in one single hollow space. Our internal organs are housed in three distinct cavities: chest, abdomen and pelvis.
respiratory system	Frogs breathe through their skin. Known as cutaneous respiration, this process allows oxygen to pass through the skin and directly into the bloodstream. Frogs also have neither ribs nor diaphragms, body parts that help us breathe. And, their chest muscles are not used in breathing.
reproductive system	Although both humans and frogs produce eggs, frog eggs are fertilized externally. Can you think of any other differences?

skeletal system	Frogs have one forearm bone, while we have two. There are many other differences. Can you see any others?
circulatory system	A frog heart has two upper chambers and only one lower chamber, compared to our hearts, which have two upper and lower chambers.

Humans and amphibians have lots of differences too. We humans don't have any of these distinctly amphibian features:

Body Part	Function
nictitating membrane	This clear, retractable membrane protects each eye.
tympanic membrane	This circular eardrum is located behind each eye.
eustachian tube	This connects the middle ear with to the mouth, or buccal cavity.
mucous glands	Located in the skin, these glands secrete mucous to keep skin moist.
granular glands	These glands secrete sticky, bitter substances to make amphibians unattractive to predators.
vomerine teeth	Two rough pads on the roof of the mouth used to hold prey.
cloaca	This cavity collects materials from intestines, urinary bladder and reproductive organs.
glottis	This slit-like opening from throat to lungs plays an important role in respiration.
gills	These help amphibians breathe while they are tadpoles.